537.e.2

A
COURSE
OF
Experimental Philoſophy.

CONTAINING,

I. *Demonſtrations of the Univerſal Laws of Motion, and the Force of all ſimple and compound Machines.*

II. *The wonderful Effects of the Gravitation of Fluids.*

III. *The peculiar Properties of the Air, conſider'd as an* Elaſtick *Fluid.*

IV. *The Principles of Opticks, explaining the Nature of Viſion, of Reflecting and Refracting Glaſſes, and of Light and Colours, according to Sir* Iſaac Newton's *Principles.*

NB. That the Courſe will contain not only all that is uſual, but likewiſe ſome conſiderable Experiments which are entirely new; and that the *Apparatus* itſelf is new and complete, and every thing contriv'd according to the lateſt Improvements. The whole being very diverting and uſeful, not only for thoſe who have learnt the *Mathematicks*, but for ſuch as are not at all acquainted with that Study, by which they may with Eaſe and Pleaſure come to the Knowledge of thoſe Things which cannot be attain'd any other way without great Labour and Application.

To be perform'd by Benj. Worſter, *A.M. and* Tho. Watts, *at the* Accomptant's Office *for qualifying young Gentlemen for Buſineſs, in* Little Tower-ſtreet.

MECHANICKS.

CONcerning the Univerſal Properties of Bodies.
Of Matter and Vacuum.
Experiments to prove a Vacuum.
The Univerſal Law of Gravitation explained.

The Law of Coheſion, or the Attraction of the ſmall Parts of Bodies, deduc'd from the Aſcent of Fluids in ſmall Tubes, and between Glaſs-Plates, and variety of other Experiments.

Both theſe diſtinguiſh'd from Electrical Attraction.

Experiments relating to Electrical Attraction.

The Electrical Phoſphorus.

Mercurial Phoſphorus.

Liquid Phoſphorus.

Solid Phoſphorus.

The Light of Phoſphorus augmented in Vacuo.

Concerning Motion in general.

Experiments to diſtinguiſh Motion from Velocity.

Of Abſolute and Relative Gravity.

Experiments to explain the Nature of, and to find the Center of Gravity in all Bodies, and to diſtinguiſh it from the Center of Magnitude.

The Experiment of the Double Cone rolling upwards.

A heavy Body, which of itſelf would fall from a Table, hinder'd from falling, by adding a heavier Body to it.

Experiments about the Falling, Sliding, and Rolling of heavy Bodies.

Concerning the Center of Motion.

Concerning the Diſtance and Line of Direction of a Weight and Power.

Experiments to ſhew the Feats done by *Sampſons*, or ſtrong Men.

Of ſimple Machines.

Of Balances, which are either Scales or Still-yards.

Of the four Kinds of Levers.

Of Pullies, ſingle and combin'd.

Of the Wheele and Axle.

Of the Wedge.

Of the Screw.

Compound Engines.

Sails of Ships, Wind-Mills, Water-Mills, &c. explain'd on theſe Principles.

Experi-

Experiments to ſhew how Men or Horſes of unequal Strength may be made to carry or draw a Burthen in Proportion to their Strength.

Experiments to ſhew the Advantage of great and ſmall Wheels in Coaches, Cars, *&c.*

A general Method to determine the Quantities of Friction in all Engines.

Sir *Iſaac Newton*'s firſt Law of Motion demonſtrated.

That the Compoſition of Forces in ſeveral Directions, not contrary to each other, produces a new Direction in a Diagonal Line.

An Experiment to ſhew, that the Line of the Relative Aſcent and Deſcent of a projected Body, is the ſame; whether the Place from whence 'tis thrown be continually at reſt, or in continual uniform Motion.

Objections againſt the Motion of the Earth, ſolv'd from this Principle.

The Centripetal and Centrifugal Forces of ſolid and fluid Bodies in Motion, explain'd and demonſtrated by Experiments.

Monſieur *Des Cartes*'s *Vortices* exploded.

Introduction to the Theory of Projectiles and Motion of the Heavenly Bodies.

How a Body will move, when its projectile Force either yields to, overcomes, or exactly balances that of Gravity.

Sir *Iſaac Newton*'s ſecond Law of Motion demonſtrated.

An Experiment to ſhew that the Velocity of Falling Bodies is as the Times, and the Spaces gone thro' as the Squares of the Times of Falling.

The Force of Reſiſting Mediums conſidered.

A curious Experiment to explain the Foundation of the Art of Gunnery.

The Nature of Fortification explain'd from a large and curious Plan.

The Moon's Motion explain'd from the Doctrine of Projectiles.

The Motion of the Planets and Comets deduc'd from the ſame Principle.

The Tides, and Phaſes of the Moon demonſtrated.

Experiments concerning the Deſcent of Bodies on inclin'd Plans, being an Introduction to the *Theory of Pendulums*

Experiments concerning Pendulums.

Center of Oſcillation explain'd.

A Cycloide deſcrib'd.

Cycloidal Cheeks for Pendulums.

The Motion of Pendulums alter'd by Heat and Cold.

That the Motion of Waves in the Sea anſwers to the Motion of a Pendulum.

Sir *Iſaac Newton*'s third *Law of Motion* demonſtrated.

Flying and Swimming accounted for.

Experiments with the Load-ſtone.

Experiments concerning the Laws of the Communication of Motion in hard and elaſtick Bodies.

HYDROSTATICKS.

Concerning Fluids in general.

Experiments to prove that Fluids gravitate in Fluids of the ſame kind.

That Fluids of different Kinds gravitate upon each other.

That Fluids preſs in all manner of Directions at the ſame time.

That the Quantity of that Preſſure in all Fluids is Proportional to the perpendicular Height of the Fluid in all Parts of the containing Veſſel.

That a Pint of Water may be made to preſs with as great Force as ſeveral Gallons.

To raiſe any given Weight by the Force of a Man's Lungs only, provided he blows thro' a Tube proportionably ſmall.

An Experiment of Lifting a Weight by a Chain of inflated Bladders, apply'd to muſcular Motion.

Several other Experiments to explain the Hydroſtatical Paradox.

Experiments to ſhew how high, and why Water will riſe in Fountains and oblique Jetts, and the beſt way of making ſpouting Pipes.

The Expence of Water ſpouting from equal Holes at any given Diſtance from the Surface computed, and ſhewn to be as the ſquare Root of thoſe Diſtances.

The working of Syphons ſucking, forcing, and lifting Pumps explain'd.

Experiments to ſhew that Bodies heavier than Water, when weigh'd in Water, loſe as much of their Weight as is equal to their Bulk in Water; and Bodies lighter than Water will ſo ſwim in it, that a Quantity of Water equal in Bulk to the Part immers'd, will be equal in Weight to the whole Body.

The Hydrometer.

The hydroſtatical Balance to determine ſpecifick Gravities.

Glaſs Bubbles accounted for.

PNEUMATICKS.

EXperiments concerning the Nature of the Air in general.

That the Denſity and Spring of the Air is as the Force that compreſſes it.

That the Preſſure of the Air decreaſes, according to its Diſtance from the Surface of the Earth.

Cupping Glaſſes.

That the Spring of the Air may be ſo weaken'd by Compreſſion, as to require time to recover its former Elaſticity.

The Riſing and Falling of the Quick-Silver in the Weather-Glaſs, explain'd and accounted for.

The different ſorts of Barometers.

Thermometers and Hydrometers of ſeveral Kinds.

The Effect of high Winds on the Barometer, ſhewn by an artificial Storm.

The Air-Pump taken to Pieces, and Manner of its Working, explain'd.

Several Experiments, which directly prove the Weight, Preſſure and Spring of the Air, by breaking Glaſs-Viols, the Senſe of Feeling, the Phænomena of Bladders, Glaſs Bubbles, Fountains of ſeveral ſorts, and the Diving Bell.

Barometers in *Vacuo.*

The famous Experiments, with the Hemiſpheres.

Wind Gun.

The ſurprizing Motion of ſeveral ſorts of Liquors in *Vacuo.*

Experiments with the Condenſing Engine.

Experiments to prove, that Sound can't be convey'd without Air, and that 'tis increas'd or diminiſh'd, according as the Air is rarify'd or condenſed.

That Fire and Flame are fed by the Air.

That Gun-powder is fir'd in *Vacuo*, without any Exploſion.

The Effects of rarify'd, condens'd, and burnt Air upon the Life of Animals.

The Force of rarify'd Vapour in raiſing Water by Fire, *&c.*

With ſeveral other curious Experiments, by the Air-Pump.

OPTICKS.

OF Viſion in general.

That when Rays of Light are reflected, the Angle of Incidence is equal to that of Reflection.

The Principles of Catoptricks explain'd.

Of Plain, Concave, and Convex Mirrors.

A Concave Cylindrick Mirror.

Cylinder and Picture.

The Cauſe and Law of Refraction, explain'd by Experiments.

Multiplying Glaſſes.

Experiments to ſhew the Nature of Convex and Concave Glaſſes, and the manner of the Rays of Light paſſing through them, and uniting in their Focus's.

Water made to Burn by collecting the Sun's Rays into a Focus.

Camera obſcura.

The Magick Lanthorn.

The Diſſection of the Eye.

Experiments to ſhew the Nature of the Defects in the naked Eye, and how Perſons ſo affected may be reliev'd.

The Nature and Uſe of Microſcopes and Teleſcopes.

How to meaſure the Refraction of any ſort of Liquors.

An Experiment to meaſure the Refraction of the Air.

A new and moſt curious Experiment to ſhew the Circulation of the Blood in the Lungs of a Frog.

Sir *Iſaac Newton*'s Theory of Light and Colours prov'd by Experiments.

Experiments to ſhew the Cauſe of the Rainbow.

The Charge of going the Courſe is two Guineas and a Half; one on Subſcription, the Remainder the third Day of the Courſe.

There will be frequent Courſes; and Subſcriptions continually taken in at the Place of performing, at Mr. Innys'*s*, *Bookſeller, near S.* Paul'*s* Church, *and at Mr.* Clarke'*s*, *Stationer, in* Birchin-Lane, *near the* Royal-Exchange.

Thoſe that are deſirous may go over the Courſe again for one Guinea and a Half; and afterwards as often as they pleaſe gratis.

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